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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/677,188 | 10/02/2000 | Masahiro Ohmori | Q56451 | 3096 |

7590 02/23/2004

SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC
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Washington, DC 20037-3202

EXAMINER

ELVE, MARIA ALEXANDRA

| ART UNIT | PAPER NUMBER |
|----------|--------------|
| 1725 | |

DATE MAILED: 02/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/677,188 | OHMORI ET AL. | |
| | Examiner | Art Unit | |
| | M. Alexandra Elve | 1725 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on ____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) Claim(s) ____ is/are allowed.
- 6) Claim(s) 1-12 is/are rejected.
- 7) Claim(s) ____ is/are objected to.
- 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on ____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. ____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>5/2001</u> . | 6) <input type="checkbox"/> Other: ____ . |

DETAILED ACTION***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 4-8 & 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nomura et al. (US Pat. 5,541,096).

Nomura et al. discloses a photocatalyst and process for purifying and deodorizing water. The photocatalysts are inorganic porous particles having semiconductor particles deposited on the surface and walls of the pores. Examples of inorganic porous particles are perlite, obsidian, foamed silica and so forth. Semiconductor particles can be titanium oxide compounds and other materials having photocatalytic function. Binders may be used to adhere the semiconductor particles onto the inorganic porous particles. The specific gravity of the photocatalysts may be controlled by the selection of the type of porous particles and the amount of semiconductor particles deposited. A specific gravity of less than one allows the photocatalysts to disperse in the water to be treated or to float on the surface thereof. (abstract, col. 3, lines 55-59, col. 4, lines 1-67, col. 5, lines 1-54, col. 6, lines 42-61)

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Nomura et al. teaches a specific gravity of less than 1, but not the exact range of instant claims. It would have been obvious to one of ordinary skill in the art at the time of the invention to have considered the claimed ranges because close approximation is considered to establish a *prima facie* case of obviousness. See *In re Malagari*, 182 USPQ 549, *Titanium Metals v. Banner* 227 USPQ 773, *In re Nehrenberg* 126 USPQ 383. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process of optimization, since it has been held that where the general conditions of the claimed invention are disclosed in the prior art, discovering the optimum value of a result effective variable in a known process and involves only routine skill in the art. See *In re Boesch*, 205 USPQ 215.

Claims 3 & 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nomura et al., as stated in the above paragraph, and further in view of *Tabatabaie-Raissi et al.* (US Pat. 6,342,128).

Nomura et al. teaches that the photocatalyst particles should range in size from 0.1 to 100mm, but it does not disclose the size of the semiconductor particles. It should be obvious to one of ordinary skill in the art that the semiconductor particles will be smaller than the photocatalyst particles since they adhere to these particles and on the void walls of these particles.

Tabatabaie-Raissi et al. discloses a photocatalytic pollution device, which uses titanium oxides for cleaning fluid streams. A preferred form of titanium, titania catalytic material has particle size of smaller than 0.1 microns and preferably less than 0.02 microns. (abstract, col. 22, lines 44-68)

It would have been obvious to one of ordinary skill in the art at the time of the invention to use micron and smaller sized titanium oxide particles, as taught by Tabatabaie-Raissi et al., in the Nomura et al. system, because smaller particles have greater surface area and hence encourage greater reaction area, yielding a more efficient cleaning system.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See US PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is 571-272-1173. The examiner can normally be reached on 6:30-3:00 Monday to Friday.

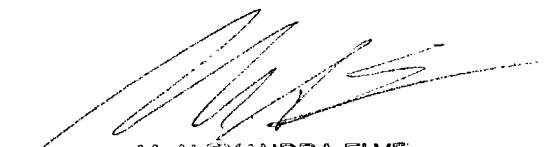
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on 571-272-1171. The fax

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phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

February 17, 2004.



M. ALEXANDRA ELVE
PRIMARY EXAMINER